

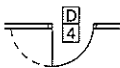
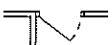
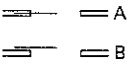
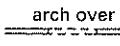
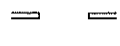

Single swing door Arcs continued to indicate doors to fasten	
Single swing door	
Sliding doors "A" Sliding into a pocket "B" Sliding exposed on wall face	
Archway	
Opening extending from floor to full height of wall	
All other openings not included under headings of doors windows & archways	

Figure 6.25 Symbolic representation for floor plans and horizontal sections

of the building on the building block. Heights of walls and windows are found on elevations, while specific construction practice can be found in sections or details. Technical information such as material size and spacing not found on the plans will be described in the specifications.

The answers to the incomplete statements in Table 6.1 are typical of those required to be found on plans before and during construction. Refer to Figure 6.26 to confirm that the statements and views are correct.

Residential building structure types

Domestic construction

To help you understand domestic construction practice and the graphical presentation of details, the following components of a building have been identified in segments or structures which, when grouped together, become the complete project.

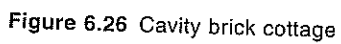
Footings

Footings are the lowest part of a building, designed to distribute the load of the building evenly over the foundation (Figure 6.27). There are several types, which are designed according to

Table 6.1 Sample question sheet

	Statement	Answer	Where found
1	The meter box is found on which detail?	South Elevation	South Elevation
2	The section size of the brushbox flooring to the porch is	Ex 75 × 25	Floor Plan
3	The window frames are	Aluminium	North Elevation
4	The internal dimensions of the bedroom are	4 830 × 3 190	Floor Plan
5	The thickness of the internal walls is	110	Floor Plan
6	The kitchen floor is covered with	Vinyl tiles	Floor Plan
7	The sill height of window 5 off the floor is	1 200	North Elevation
8	Window 1 is on the east elevation of the	Bathroom	Floor Plan
9	The overall size of the external walls is	280	Floor Plan
10	The section size of the galvanised steel rainwater pipes is	75 × 50	Floor Plan
11	The head height of window 4 off the floor is	2 143	North Elevation
12	The width of door 4 is	970	Floor Plan
13	The width of window 2 is	3 190	Floor Plan
14	The width of window 1 is	1 210	Floor Plan
15	The section size of the rafters over the carport is	100 × 38	South Elevation

the load of the building to be supported and the ability of the foundation material to support that load. Common types of footing in building are: **Strip footings**—This is a continuous reinforced strip of concrete around the outside of a building to support the external walls. The width and



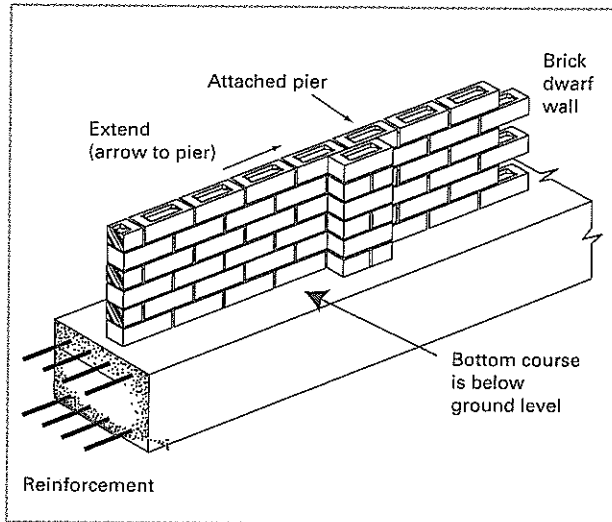


Figure 6.27 Typical detail of a reinforced concrete strip footing

depth of concrete and the amount of reinforcement needed are calculated by a structural engineer, based on the design of the building and the known soil classification, as stated in AS 2870. The bottom of a strip footing is approximately 600 mm below ground level to prevent erosion of the foundation material. Timber frame, brick veneer and cavity brick are constructed on strip footings.

Slab-on-ground—This combines the floor and the footing into one reinforced, monolithic concrete unit. This method of construction is used on level ground or sloping sites that have been cut to a level surface. The edge beam can be increased to support greater loads or to pass through top reactive soils to more stable foundation material (Figure 6.28). An alternative is the 'waffle-pod' system, consisting of a series of

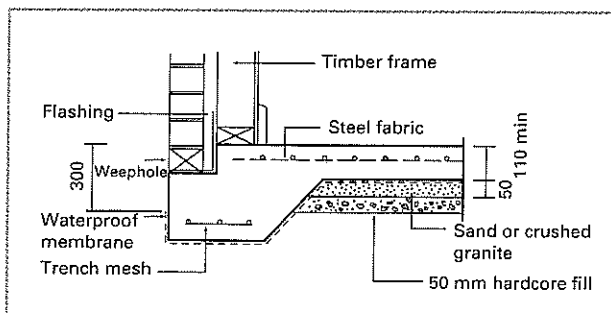


Figure 6.28 Slab edge detail in stable soil

beams running at right angles to one another with a thin working slab cast over them to form a monolithic slab with a grid support system. Services such as plumbing and electrical pipes are placed in the slab before the concrete is poured, or are built into the walls during construction. Slab penetrations must be adequately protected to prevent the entry of termites. Slab-on-ground has become a popular alternative in floor construction of timber, brick veneer and cavity brick buildings (Figure 6.29).

Blob footings—These are square, rectangular or round footings placed under piers or posts and may contain reinforcement, depending on the load to be carried (Figure 6.30). Their size should be calculated so that the same pressure is applied to the foundation material as to strip footings

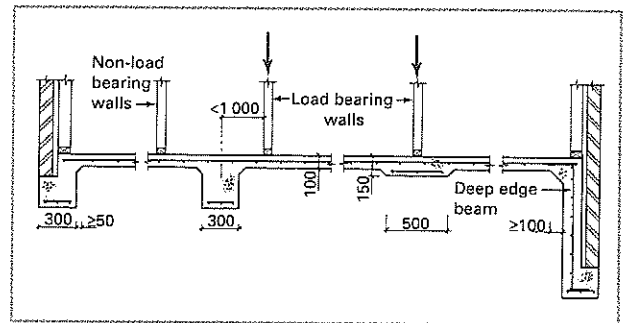


Figure 6.29 Slab-on-ground for masonry, veneer and clad frames

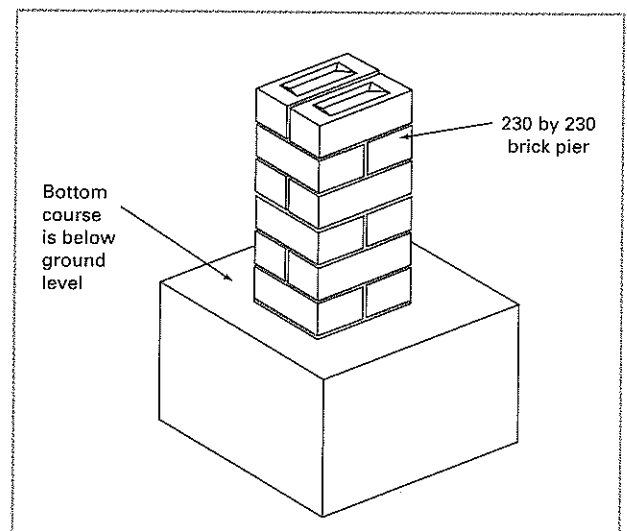


Figure 6.30 Typical blob footing with a minimum depth of 200 mm

when both are used on the same building. Blob footings are commonly used for supporting brick piers and bearers and joists in timber floor construction. Alternatives to this type of support include steel adjustable piers, pre-cast concrete piers and treated timber stumps (generally used in states other than NSW).

Flooring systems

A flooring system is the floor surface and the method of floor framing used as support to the ground floor. Common systems in use are:

Suspended timber floor—One system consists of flooring boards in narrow strips laid on a timber or steel framing of bearers and joists and supported by brick walls or piers. The flooring is placed between the walls and is cramped and nailed in position when the building is advanced enough for the flooring not to be affected by the weather. (See Figure 6.31.)

Another system consists of sheet flooring of plywood or particle-board laid on a timber or steel framing of bearers and joists before the walls are erected, and therefore gives the advantage of providing a platform to work on. Both of these

methods require a minimum 400 mm clearance above the ground to the underside of bearers, which provides ventilation of the area beneath the floor framing to prevent decay in the timber framing. The timber bearers and joists used to support the flooring are placed at specified centres apart and are of a sectional size according to AS 1684.2—1999, Residential timber-framed construction—Non-cyclonic areas.

Slab-on-ground—This is a reinforced concrete floor placed directly onto the ground. One advantage of this method is the reduced building height. See Figures 6.28 and 6.29, and previous information on footings for details.

Suspended slab—This is a reinforced concrete floor suspended above the ground and supported on brick walls (Figure 6.32). The amount and type of reinforcement in a suspended concrete floor will be greater than that used in a slab-on-ground as a suspended slab must carry the floor loads between supports.

Wall structures

This is the composition of the external and internal walls. The walls may be constructed from

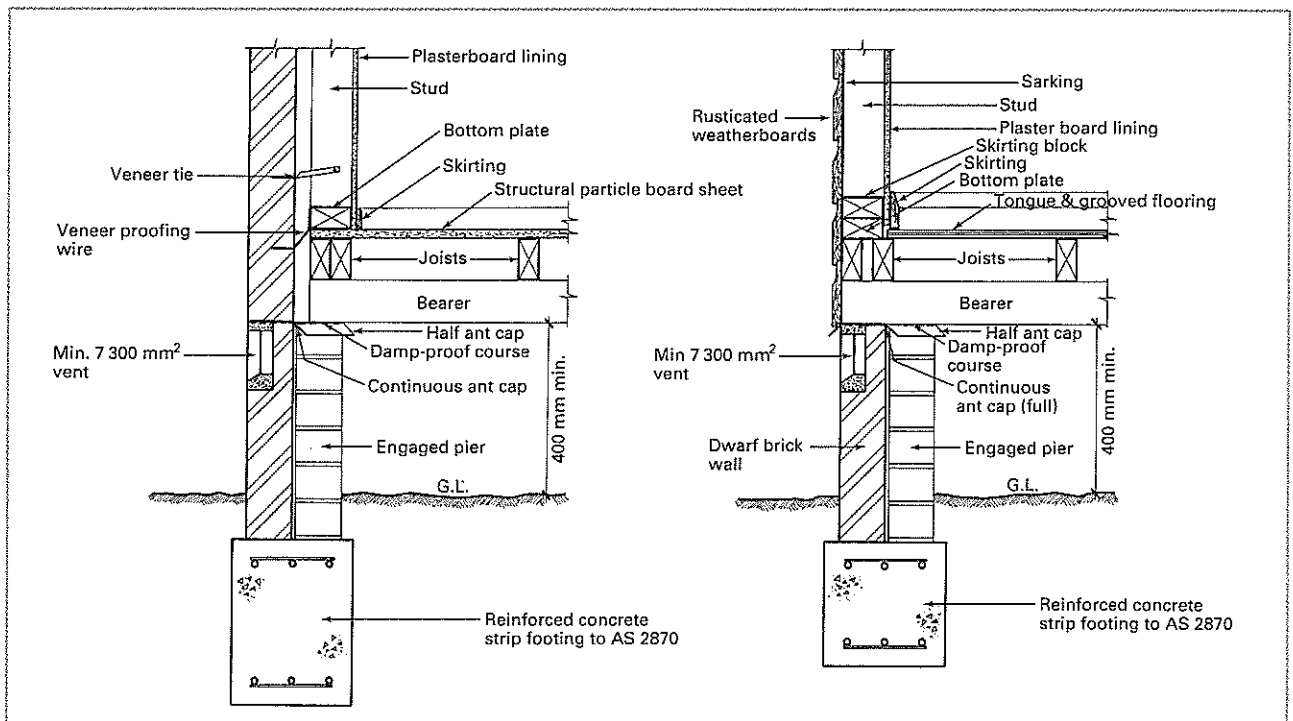


Figure 6.31 Vertical section through external walls of brick veneer and timber-frame construction

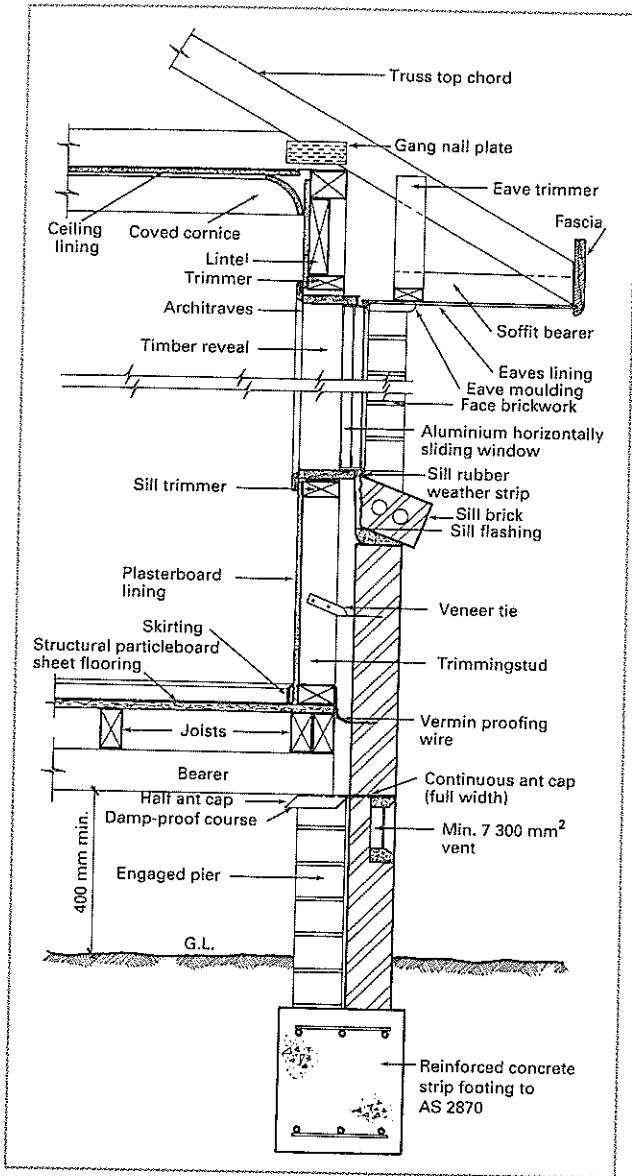


Figure 6.34 Vertical section through an external brick veneer wall and horizontally sliding aluminium window

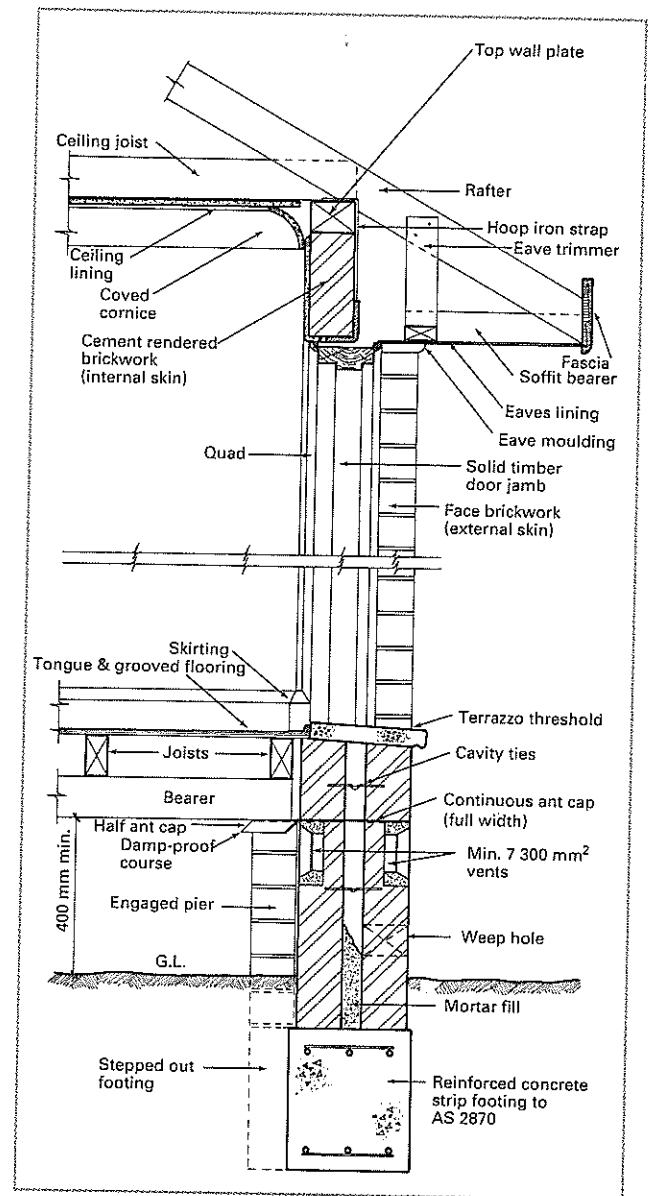


Figure 6.35 Vertical section through an external cavity brick wall and timber door jamb

an alternative to timber in the manufacture of ground floor framing, wall framing and truss fabrication. Each system is prefabricated in panels or sections off-site, with final assembly carried out on-site. There is also a wide range of alternative lightweight cladding options from fibre-cement sheeting systems to panels of styrene and autoclaved concrete systems.

Roof structures

Roof structure is the term given to the roof framing, eaves and roof covering. Conventional

and trussed roof construction allow for freedom of design, with the floor plan of the building determining the final shape of the roof. Common shapes in either conventional or trussed roof buildings are:

- gable roof
- hip roof
- hip and valley roof
- gambrel or Dutch gable
- jerkin head.

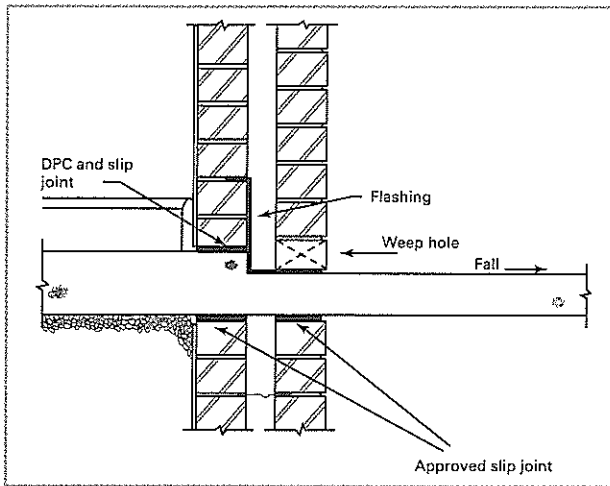


Figure 6.32 Suspended concrete floor with balcony projection at first floor level

one or several materials. Common wall structures are:

Timber frame—External walls are constructed of timber framing, with a cladding on the outside of timber or fibre cement weatherboards or sheets, and a lining on the inside of plasterboard. Internal walls are constructed of timber framing and are lined on both sides with plasterboard (Figure 6.33).

Brick veneer—This is for external walls only, consisting of a timber frame lined internally with plasterboard and an external skin or veneer of brick (Figure 6.34). The brick skin and the timber frame are separated by a gap (cavity) of around 40 mm (25 mm min. – 60 mm max.) to allow for ventilation and to prevent contact between the timber and the bricks. The timber wall is load-bearing, carrying the roof and ceiling, while the outer skin of brick is used for weathering, security and visual effect. The brick skin is tied to the timber frame by veneer ties built into the brickwork and nailed to the frame. A barrier of wire mesh (vermin wire) is placed at the base of the timber frame and built into the brick wall to prevent rodents from entering the frame through the cavity. Internal walls are constructed in the same way as for a timber-framed construction.

Cavity brick—External walls are constructed of two skins of brick, separated by a gap (cavity) of 50 mm and held by wire galvanised cavity ties

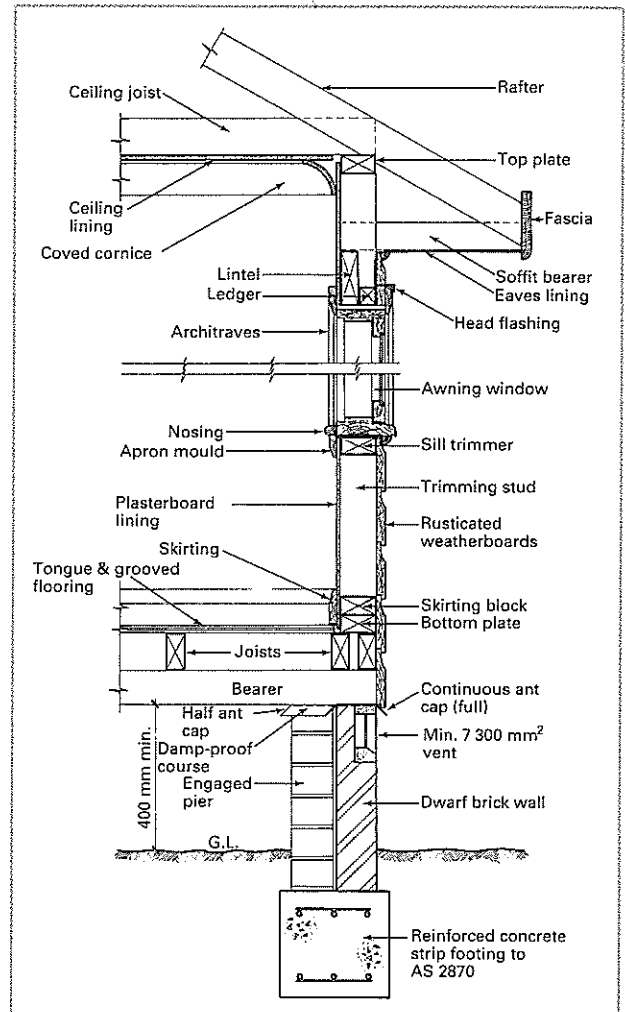


Figure 6.33 Vertical section through an external timber frame wall and timber awning window

with a drip groove to prevent moisture travelling from the outer skin of brick to the inner skin when the outer skin becomes wet (Figure 6.35). The inner skin of brick is the load-bearing wall, and the outer skin is for weathering, security and visual effect. Cavity brick construction has the advantage of good thermal and sound insulation. Internal walls are constructed of one brick thickness, which can either be left as it is or have a 13 mm thick cement render applied over it and be painted or decorated.

Alternative construction methods

Current building trends allow for conservation of timber resources, resulting in the use of metal as

Common types of roof structure are:

Conventional roofing—The timber roof framing is cut out and assembled (pitched) on-site. Structural framing members used in conventional roofing are rafters, ridge boards, hips, purlins, struts and collar ties (Figures 6.36 and 6.37). Ceiling framing consisting of ceiling joists, hanging beams, strutting beams and trimmers combine with and tie the roof framing to the walls. Sectional size and spacing of structural members are determined by the Timber Framing Code. The external finish of conventional roofing is provided by fascia boards, barge boards, gable cladding for gable roofs, and by eave or gable linings. Roof coverings, such as cement or clay tiles and corrugated metal sheeting, will influence the design and construction technique of conventional roofing.

Trussed roofing—Roof trusses are fabricated off-site, then transported to the site and lifted into position. This enables fast construction, the use of

less material and the added advantage of internal design flexibility, as trussed roofs are supported on the external walls only. The structural design of a truss enables the top chord, bottom chord, struts and ties to support and distribute the roof and ceiling loads to the external walls. Trusses are designed according to the span between the external walls, the ceiling and roof loads, and the roof pitch. Roof coverings and external finish are the same as in conventional roofing. Trusses are fabricated from either timber or steel. (See Figures 6.38 and 6.39.)

Environmental controls

Site drainage

Surface and subsoil drainage of new or existing buildings is a very important aspect of building

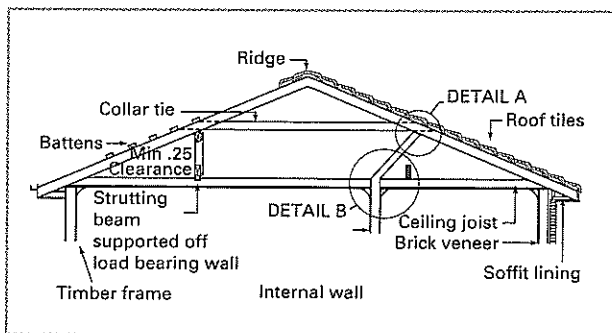


Figure 6.36 Vertical section through a conventional roof

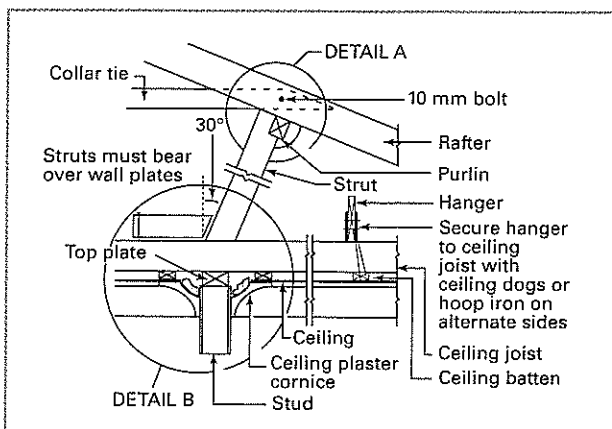


Figure 6.37 Detail A and B from Figure 6.36

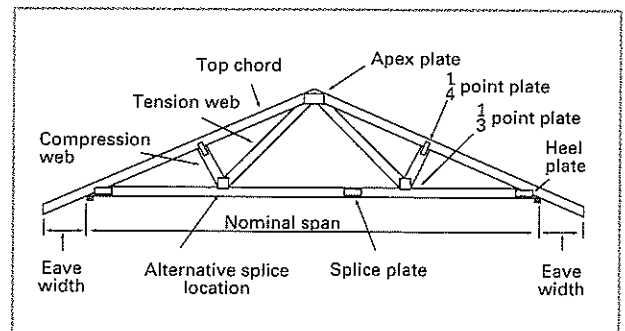


Figure 6.38 A simple truss showing all members

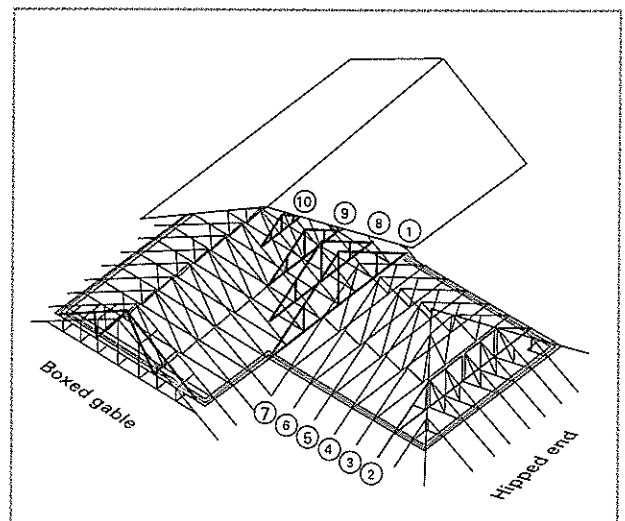


Figure 6.39 Truss roof layout showing erection sequence